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A REVIEW OF URBAN TRANSPORTATION SERVICES FOR DISABLED PERSONS

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by

HICKLING-PARTNERS INC.

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Summary

Disabled persons face a wide variety of barriers when attempting to travel: some are a result of the personal limitations of the traveller and some are due to the limitations of urban transportation services and their environment. The problem can be traced, to a considerable extent, to sometimes misunderstood, often conflicting, objectives and conceptions of social integration, personal independence, human rights, and efficiency of service.

Transportation authorities throughout the world, with the assistance of disabled groups, have attempted various measures to facilitate access to urban transportation services for disabled persons. Measures adopted range from the provision of specially adapted and manufactured automobiles in Germany to full accessibility on conventional transit vehicles in several cities in the United States; from full accessibility on conventional taxi systems in Australia to special transit services in Canada and Sweden.

The individualistic nature of the measures undertaken reflects the difficulties in finding cost-effective and acceptable solutions to the needs of the disabled. The measures are best characterized as being at an early stage of development, with considerable research and experimentation being undertaken.

Often the consideration of transportation for disabled persons has focused on two alternatives: integration through fully accessible fixed-route public transit services versus the provision of separate specialized services. Other alternatives that seem to find widespread acceptance, especially in Europe, involve facilitating the

use of more personal forms of transportation such as taxis and private automobiles, while at the same time providing partial accessibility to conventional public transit services.

If the aims of social integration, personal independence, human dignity and freedom of choice are to be integrated into the existing objective of cost-efficiency, then it would seem from the assessment presented in this report that the preferred direction would be to emphasize the use of more personal forms of transportation for the disabled population by means of improved or re-oriented institutional and financial frameworks for the provision of urban transportation services.

1. THE DISABLED TRAVELLER

The definition of disabled persons is characterized by the close correlation between social conditions and the nature and effects of a disability. In other words, what a disability is and what its effects are depend partly on social conditions.

While people with disabilities experience real personal limitations (e.g., not being able to hear, to see, to walk, or to reason and conceptualize as well as others), many of the limitations associated with being disabled result from society's expectations and response to disabilities. An individual with a disability, then, is identified as a person who cannot meet society's expectations in the same way as the non-disabled.

This connection between society and disability emerges clearly in any investigation of urban transportation. Disabled persons face a variety of barriers when attempting to travel: some are a result of the personal limitations of the traveller, some are due to the limitations of the type of transport used and some are due to prevailing attitudes. The specific problems vary radically, depending on health, income, age, access to a car, availability of family and friends, and residential location.

The point to emphasize is the causal relationship between disabled persons and disablement situations and the fact that disabled persons as a group are inherently so heterogeneous that it would be an extreme over-simplification to assume that there was only one market group, let alone one kind of demand or one policy for all disabled persons.

Market Identification

If disabled persons are identified without reference to mobility, approximately 2.3 million individuals in urban areas in Canada are being considered -- about 14 percent of the urban population (1).

Not all those defined as disabled, however, experience limitations in the amount, or kind, of personal activity. Individual ability to cope with disabilities varies widely from one person to another, even in the same situation. It is estimated that only 1.4 million persons are limited in the amount or kind of activities they undertake and only 0.8 million are limited in mobility -- approximately 5 percent of the urban population (2). As the statistics imply, the majority of disabled persons are able to perform the physical and mental tasks necessary to make use of available transportation facilities.

Disabled persons who cannot make effective use of available transportation -- the mobility-limited disabled -- are at a disadvantage since transportation offers a greater availability of opportunities for individuals, ensuring a greater level of independence and self-determination.

The current major issues relating to the transportation of disabled persons are directly related to the gap between the need for improved transportation services and the satisfaction already provided by such services. Need in this instance is taken as a comparative need defined by objectively assessing whether or not the disabled are lacking in transportation relative to the norm achieved by other equivalent sections of society.

This principle of equity is raised in a proposed definition of mobility-limited disabled persons, suggested by the Canadian Human Rights Commission and originally developed by the United States Department of Transportation (3):

> Any individual who by reason of illness, injury, age, congenital malfunction, or permanent or temporary incapacity or disability, including any person who is wheelchair-bound or has semi-ambulatory capabilities, is unable without special facilities or special planning or design to utilize public transportation facilities and services effectively.

Mobility-limited disabled persons cannot use public transportation as effectively as non-disabled persons, special services may not provide an equivalent level of service and difficulties are often encountered in attempting to use private transportation.

A Market Profile

A recent study on the number of mobility-limited disabled persons in Canada ( ) estimated that in 1976 there were approximately 781,000 transportation-handicapped people in Canada, which was approximately five percent of the eligible population (the 'eligible' population excluded the rural population, children under five years of age, and institutionalized persons).

MARKET SEGMENTS

Wheelchair User

Impaired Coordination

Impaired Ambulation

Visual Impairments

Hearing Limitations

Learning Limitations

Of these 781,000 mobility-limited disabled persons, the following comprised the types of disabilities: 5.6 percent were in wheelchairs, 24.4 percent required other mechanical aids, 21.2 percent had visual impairments, 21 percent had hearing disabilities and 46.3 percent had other minor dysfunctions affecting coordination. As seen, the disabled population is composed of numerous possible groups or market segments.

One possible definition of market segments is illustrated in Table 1 which is a simplification of the complex relationship between the disability and the disablement situation. As shown in the table, if an attempt is made to define a target market for whom measures for integration appear to be most urgent, a figure of approximately 149,000 or 1 percent of the population is derived.

Of the mobility-limited disabled group, it was estimated that 19 percent were completely unable to use regular public transportation, 29 percent could use it with much difficulty while 52 percent had some difficulty in using public transportation. About 93 percent of the

Table 1: Disabled Persons by Market Segment

Market Segment	Able to Use Transit with Difficulty	Unable to Use Public Transit	Total No. of Disabled Persons
Wheelchair User	12,200	31,200	43,400
Impaired Coordination	317,300	44,700	362,000
Impaired Ambulation	132,100	58,900	191,000
Visual Impairments	127,000	38,200	165,200
Hearing Limitations	129,600	34,100	113,800
Learning Limitations	79,500	25,000	104,500
Total	632,000	149,200	781,200

Note: Columns do not add up because of multiple disabilities.

group were physically capable of using taxis and about 41 percent had a licence to drive their own car.

The incidence of mobility-limited disabled persons was found to increase with age: only one percent of people aged 5-25 years were disabled, whereas 35 percent of those over 80 years of age were so classified. The incidence of mobility-limited disabled persons was also found to vary by household income and by education level: those households with lower incomes had a higher incidence of disabled persons than higher-income households; and the incidence of disabled persons was found to be higher among those with lower levels of eudcation and lower among those with higher levels of education.

Population projections for Canada to the year 2000 indicate that, while the population would increase by 33 percent, the older age groups would have much higher rates of increase than the younger age groups. Since the incidence of disability increases with age, it is estimated that the disabled population would increase by 64 percent during this period.

Travel Patterns

Health, age, income and car availability all influence the extent to which disabled persons make use of public transportation services. Disabled persons make an average of just under one trip a day, or about half the number made by non-disabled persons (see Table 2).

The automobile is the favoured mode of travel with 71 percent of the disabled using that mode. eleven percent using public transit, three percent using taxis and two percent using special services. In comparison with the non-disabled population, disabled travellers used the private automobile more as passengers and considerably less as drivers. The fewer trips taken on public transit suggest the relative inaccessibility of this mode (2).

Generally, the more severe the disability the less a person travels. Travel behaviour is also closely related to income. A study made in Portland, Oregon found that severely disabled persons with low incomes travelled less than half as much as persons with similar disabilities but high incomes (4). Severely disabled persons with high incomes tended to travel almost as much as non-disabled persons.

Another factor was that of car availability. Disabled persons who have a car available to them made 54 percent more daily trips than those who do not own a car, or do not have a friend or relative to

Table 2: Daily Trips by Disabled Persons by Mode

Mode	Daily Trips By Disabled Persons	Daily Trips by Non-Disabled Persons	Difference in Trip-Making
Private Auto			
As Driver	0.35	1.10	-0.75
As Passenger	0.32	0.28	+0.04
Public Transit	0.10	0.21	-0.11
Taxi	0.03	0.02	+0.01
Special Service	0.02	--	+0.02
Walking	0.07	0.09	-0.02
Other	0.06	0.07	-0.01
All Modes	0.95	1.77	-0.82

drive them. Among disabled persons who usually had access to a car, only about 6 percent of all trips were made by public transit, but disabled persons without a car available made 41 percent of all their trips by public transit (5).

Most of the difference in the amount of travel by disabled persons relative to others is related to the fact that fewer of them have jobs. Disabled persons made 75 percent fewer trips to work than

Table 3: Daily Trips by Disabled Persons by Purpose

Purpose	Daily Trips By Disabled Persons	Daily Trips by Non-Disabled Persons	Difference in Trip-Making
Work	0.17	0.71	-0.54
Shopping/Personal Business	0.32	0.51	-0.19
Leisure/Recreation	0.27	0.41	-0.14
Medical/Therapy	0.10	0.04	+0.06
School/Education	0.09	0.12	-0.03
All Purposes	0.95	1.77	-0.82

non-disabled persons (see Table 3). Of the 0.78 million disabled persons living in urban areas, only about 15 percent had jobs. The high incidence of elderly and retired persons among the disabled population accounts for much of the lower employment. Even so, only about one-quarter of disabled persons of working age hold jobs.

Disabled persons also travel much less for shopping, leisure and personal business than the non-disabled. While difficulty in travelling is undoubtedly a major reason, the fact that they generally have less money to spend also weighs heavily.

It should be noted that the two columns in Table 3 are not entirely comparable because of the high incidence of elderly in the disabled population. Among persons of similar age and economic circumstances, the difference in the number of daily trips made by disabled and non-disabled persons is smaller than the statistics show in Table 3.

Another factor to note is that much of the information presented in this chapter is derived from American surveys and studies. Comparable Canadian information is generally not available.

2. TRANSPORTATION OPTIONS

While the mobility requirements of disabled persons in the urban environment vary considerably, depending upon their particular functional limitations and preferences; at the same time, a great many different measures for meeting the requirements have been attempted throughout North America and Europe in recent years.

The various countries have sought to deal with the mobility problems of disabled persons by adopting various lines of approach which, very schematically, may be classified under one or the other of the following groups:

- adapting public transit service,
- providing special transit services,
- facilitating the use of taxis, and
- facilitating the use of the private automobile.

Within each of these four major options, there are, of course, numerous sub-options related to financial or institutional considerations. These sub-options are generally the 'means' of achieving the desired option and include such items as fare concessions, user-side subsidies, mobility allowances, brokerage systems, transit authorities, management firms and so forth.

The individual measures undertaken by the various countries are summarized in Table 4. Although the variety of measures under each of the major options stands out, so does the degree of commitment to more personalized aid within the context of providing a total system of movement, from point of origin to destination.

Table 4: Transport of the Disabled in Various Countries

COUNTRY	DEFINITION OF DISABLED PERSONS	NUMBER OF DISABLED PERSONS	OVERALL TRANSPORT DIRECTION	PUBLIC TRANSIT		
				FARE CONCESSIONS	ACCESS TO BUSES	ACCESS TO RAIL
AUSTRALIA	Broad definition related to ability to use public transit.	1,200,000 or 9.0 percent of the population, two thirds of which cannot use existing public transit.	Provide equal cost transport through subsidized accessible door-to-door transport on taxis.	Unknown	Measures of limited scope for ambulant disabled persons.	Measures of limited scope for ambulant disabled persons.
AUSTRIA	Several fairly broad definitions depending on the scope of the measures concerned.	Unknown. Only a sample survey of physically-disabled persons in the broadest sense in December 1976.	Generally provide special services to meet particular needs.	Free transport for disabled ex-servicemen and for their escorts (subject to certain conditions) and for blind people.	For urban transport services, use of the Steyr CityBus designed to facilitate easy access for disabled persons. Other measures of limited scope concerning vehicles.	Lifts are provided in multi-store stations.
BELGIUM	Broad definition	184,339 in 1970 or 2.7 percent of the population.	Generally provide financial assistance so that disabled persons can use taxis.	Only one ticket needed for a severely disabled person accompanied by an escort (railways only).	Research on vehicles being undertaken by manufacturers.	No
CANADA	A person who is unable to use public transit as effectively as non-disabled persons.	780,000 in 1976 or 4.97 percent of the urban population 19% of which cannot use public transit.	As a rule, local authorities have decided to provide special paralleltransit services.	All operators provide fare concessions for the elderly and some provide free transport for the blind.	A six-month experiment was conducted in Victoria but was discontinued with discouraging results.	Rail systems in Toronto, Calgary and Montreal are not accessible. Edmonton and Vancouver made the decision to have theirs accessible.
DENMARK	A person whose mobility is temporarily or permanently reduced is regarded as a handicapped person.	No, estimates only.	Some research on accessible vehicles.	A free ticket is given to persons escorting blind people; 50 percent reduction for disabled persons (rail).	Research on the installation of ramps; lifts for long-distance buses.	Lifts or access ramps are being considered.
FINLAND	Persons with reduced capacity for activity or mobility owing to age, illness or disability.	No, order of magnitude only.	Generally, subsidize special transit and adapt public transit for the ambulatory.	None, but aid is possible.	No special arrangements as yet, but bus crews are required to help the disabled.	Helsinki underground system is to be made accessible.
FRANCE	Unknown	2,300,000 or 5.9 percent of the population in 1977.	Outline Act of June 1975 confirms accessibility of public transit but the implementing orders are not out yet.	Some fare concessions; guides of severely disabled ex-service men and civilian blind are able to ride free of charge on railways and buses.	New vehicles are being designed with a lower floor level but will not be accessible for wheelchairs.	Paris metro and Marseilles metro are not accessible. The Lille metro will be fully accessible for wheelchairs, prams, etc.

SPECIAL SERVICES		TAXI SYSTEMS		USE OF PRIVATE CAR		
DEMAND SERVICES	OTHER SERVICES	FARE CONCESSIONS	ACCESS TO TAXIS	FINANCIAL AID	PARKING MEASURES	OTHER MEASURES
None, other than private operations.	Unknown.	Government pays 50 percent of the metered fare in the Sydney demonstration project.	Experiment in Sydney using 30 modified taxi vans. Working with manufacturers to develop accessible taxi.	Unknown	Unknown	Unknown
Transport provided for educational and medical purposes; for cultural, sports & social events, and organization of excursions with the help of disabled persons' associations.	Free transport for educational and medical purposes and for wheelchair users. Subsidization of most of the costs of special transport to and from cultural, sports & social events.	For severely disabled persons, refund of taxi fares for work trips.	Special taxi service. Experiments have begun with taxis specially equipped for wheelchair bound passengers.	Refund of conversion costs of severely disabled persons' cars. Financial aid for purchase of motor vehicle for disabled person's occupational needs.	Special parking concessions and facilities are provided for disabled person card-holders.	Driving licence obtainable under certain conditions.
Demand-responsive minibus service at 48 hours notice, twice normal fare, experimental operation in Brussels since May 1978.	Special subscription service provided for transport to work or for medical care.	Local authorities issue 'taxi cheques' with a 25 to 50 percent fare reduction depending on the authority.	No special efforts.	Cost of converting vehicles for use by disabled persons covered from a special fund.	Special cards for unlimited parking; measures envisaged include reserved parking sign.	Provision of a specially-modified vehicle for driver training and driver test. Free driving license for specially adapted vehicles.
Most municipal authorities have arranged for the provision of a parallel service with various types of operators and Provincial assistance.	Many private associations provide transport for special purposes, such as the transport of disabled children.	In Toronto, a taxi operator is under contract to provide part of the special service for the disabled.	Development of a prototype taxi that could carry a wheelchair-bound passenger (the GSM taxi).	Exemption from federal sales tax for hand controls for cars.	Several local authorities have granted special parking rights to disabled persons but many have not.	Nova Scotia issues a special licence plate.
Arrangements by private organizations with the help of public authorities.	Private.	None	None	Assistance in the form of a grant or loan for purchase of a car.	Special plate allowing the disabled to exceed the parking time.	Associations lend a specially equipped car for disabled persons to take their driving test.
Special transit is ususally provided with the State paying half of the costs.	Unknown	None	Most taxis can transport a wheelchair.	Motor tax refunded according to the degree of disability.	Special parking facilities are available varying with the community.	Frequently, traffic lights with sound devices.
On the initiative of associations for the disabled, but usually organized by public authorities with some temporary state aid.	Preferential loans and reduced VAT for purchase of special vehicles for the disabled.	None	Paris taxi regulations specify that taxi drivers cannot refuse disabled persons as passengers.	Exemption from differential tax and special tax on motor vehicles (including any vehicle leased or rented for more than two years).	Local authorities are responsible for parking facilities and generally have reserved places for disabled persons.	Identity sticker for seriously disabled person. Driving licences may be obtained for indefinite period. Medical examinations are free.

Table 4: Transport of the Disabled in Various Countries (cont'd)

COUNTRY	DEFINITION OF DISABLED PERSONS	NUMBER OF DISABLED PERSONS	OVERALL TRANSPORT DIRECTION	PUBLIC TRANSIT		
				FARE CONCESSIONS	ACCESS TO BUSES	ACCESS TO RAIL
GERMANY	Related to ability to undertake certain activities and to earning capacity.	3,299,000 or 5.4 percent of the population in 1976.	Provide special services, assist adaption of taxi vehicles, provide aid to auto users, and provide minor improvements on buses and trains.	Free public urban transport is provided when need certified within a radius of 50 km of home.	Measures now being introduced in certain towns. Lowering of floor heights in buses.	Financial aid is provided for construction of facilities (lifts or ramps) for use by disabled persons. Accessible stations are still rare.
IRELAND	Unknown	100,000 or 6.6 percent of the population with 2,000 using wheelchairs.	Left to Health Boards.	Various categories of disabled persons are permitted ot travel free on services of the National Transport Undertaking and on certain private bus operators.	No special arrangements other than fare concessions.	None.
ISRAEL	Unknown	Unknown	Provide personalized assistance.	Unknown	No.	None.
ITALY	Act No. 118 of March 30, 1971 defines civilian disabled.	Unknown	Unknown	Free transport for persons escorting blind people and fare reductions for certain categories of disabled persons.	No special arrangements.	No special arrangements.
NETHERLANDS	Broad definition.	366,100 or 3.5 percent of the population.	Generally, a mix of measures.	Escort pays no fare but handicapped person pays full rate.	Current experiment to improve accessibility of tramcars and buses, exclusive of wheelchair users.	Rotterdam metro is not accessible. Amsterdam metro has lifts at all stations and is accessible.
NORWAY	Person whose mobility is reduced as result of a physical, mental or other affliction and who cannot (or only with difficulty), use public transit.	Unknown	Handicapped persons receive a basic financial support meant to compensate for extra costs of living, including transportation form the National Social Security System.	Handicapped persons, receiving social security funds due to their disabilities, are entitled to half price on virtually all public transit means.	Research in improved accessibility now in progress.	Lifts or ramps are provided at all stations of the Oslo metro.
PORTUGAL	Broad definition.	Unknown	Unknown	75% reduction on railways for handicapped ex-servicement.	No special arrangements.	No special arrangements.

SPECIAL SERVICES		TAXI SYSTEMS		USE OF PRIVATE CAR		
DEMAND SERVICES	OTHER SERVICES	FARE CONCESSIONS	ACCESS TO TAXIS	FINANCIAL AID	PARKING MEASURES	OTHER MEASURES
In certain towns transport provided by local authorities or relief agencies. In Berlin, a large-scale (40 vehicles) experiment is underway.	State assisted in the development of a new vehicle for special services: the TeleBus with an extremely low floor (curb height).	None	Financial aid is provided to fit taxis with swivel seats and a sliding mechanism. License entails test of ability to transport the disabled.	National Insurance Company pays 50 percent of the cost of a specially-adapted car (the Trabant) since 1981. Trabant is designed for the disabled.	Special parking permits for unlimited parking at meters and limited parking in no parking zones for persons with 'major motor disabilities'.	Driving license subject to restrictions related to disability.
Where public transit is unsuitable, handicapped rehabilitation bodies provide special transport which is subsidized by Health Boards.	None	No special arrangements.	No special arrangements.	A scheme of grants towards the cost of cars and/or adaptions for disabled drivers is administered by Health Boards.	Parking facilities and free parking.	Exemption from the payment of annual registration fee or the motor tax on private cars. An annual petrol allocation at a reduced price.
Unknown	Unknown	Unknown	Unknown	Tax on cars wholly or partially adsorbed by National Insurance Institute.	Unknown	Unknown
Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
A regional service (Buurtbus) will be introduced shortly, vehicles used will allow for the needs of the disabled.	Unknown	Unknown	Specially fitted taxis will be available shortly.	In certain cases, provision of the cost of equipping a special type of car and making it available free of charge.	Many free parking facilities.	Facilities for obtaining a licence.
Local public authorities are responsible and finance the organization of special services.	Unknown	Unknown	Unknown	Financial aid for disabled persons able to drive.	Right to stay longer where parking time is limited and some free parking spaces.	None
A service in Lisbon is being provided with 40 accessible buses as an experiment.	Unknown	Unknown	Unknown	Exemption from vehicle tax and customs duties on cars bought for personal use.	Special parking places.	Signs for display on cars.

Table 4: Transport of the Disabled in Various Countries (cont'd)

COUNTRY	DEFINITION OF DISABLED PERSONS	NUMBER OF DISABLED PERSONS	OVERALL TRANSPORT DIRECTION	PUBLIC TRANSIT		
				FARE CONCESSIONS	ACCESS TO BUSES	ACCESS TO RAIL
SPAIN	Broad definition.	Unknown	Unknown	Unknown	Unknown	Unknown
SWEDEN	Person who encounters difficulties in society.	1,000,000 or 12.5 percent of the population. 20,000 required a special vehicle.	Generally, a variety of measures including regulations to adapt conventional transit 'as largely as possible' to the needs of the disabled by 1985.	Pass holders for the special service are allowed to use public transit free of charge.	1982 regulations of Transport Board provide directions for adapting public transit vehicles to assist the disabled but do not require full accessibility. Volvo has developed a system of direct bus access from a platform.	Lifts in all new stations and in most of the old ones; 62 of the 94 stations on the Stockholm T-Bahn are accessible. 1982 regulations do not specify full accessibility, only minor modifications.
SWITZERLAND	Unknown	Unknown	Provide special services using accessible vehicles. Do not adapt regular transit for wheelchairs for cost and safety reasons.	Persons drawing a disability pension receive a half-price season ticket at a reduced rate. Free transport for escorts of wheelchair users or of blind persons.	Doors of buses have to provide a clearance of 80 cm for wheelchair access; floors built as low as possible; but no intention of providing full accessibility.	No special arrangements.
UNITED KINGDOM	Broadly defined in the National Assistance Act of 1948.	About 3,000,000 or 6.4 percent of the population; in excess of 245,000 using wheelchairs.	Provide a mobility allowance to compensate for extra costs of transportation.	For certain trips by rail, elderly travel for half-price; blind persons, wheelchair users, and companion can travel 'two for the price of one'.	Operators and manufacturers are attempting to make step and floor height as low as possible for ambulant disabled persons.	An extensive study in 1980 to find measures for adapting London Metro to needs of the ambulatory disabled. Some special lifts on the Tyne and Wear Metro system.
UNITED STATES	Person who by reason of illness, injury, age, or disability is unable to utilize public transportation as effectively as the non-disabled.	7,440,000 or 5.0 percent of the urban population; 409,200 who use a wheelchair; 1,405,000 cannot use public transit at all.	Congress has made it national policy that disabled have the same right to transportation services as the general public. New DOT regulations of July 1981 allow local communities to decide the best measures.	Mass Transportation Act requires any system that receives federal funds to carry elderly and disabled at half-fare outside peak periods.	In a recent survey, 66 percent of operators had lift-equipped buses. In total 18 percent of the buses were equipped with lifts.	Only Washington, San Francisco and Atlanta provide full accessibility. Another six intend to provide some accessible stations.

SPECIAL SERVICES		TAXI SYSTEMS		USE OF PRIVATE CAR		
DEMAND SERVICES	OTHER SERVICES	FARE CONCESSIONS	ACCESS TO TAXIS	FINANCIAL AID	PARKING MEASURES	OTHER MEASURES
Only four towns have a special service: Barcelona, Malaga, Palma de Mallorca, and Santa Colma de Grammet.	Unknown	Unknown	Unknown	Unknown	Some measures with regard to parking in certain towns.	Driving licence expensive and difficult to obtain.
All of the 277 local authorities operate a special service of one form or another. Disabled persons pay the same price as for regular public transit. 3.2% of total population are eligible.	Other special services are provided as required.	Sweden has had greater recourse to its taxi system than any other country: 40% of all taxi journeys in Stockholm are made by disabled persons on a subsidized fare basis.	No special arrangements for accessible vehicles; but considerable efforts re fare payment and control.	Financial aid for purchase of a car. Tax exemption for vehicle acquired by disabled persons.	Parking places for vehicles of handicapped or special permits when parking is forbidden.	Special driving licence for disabled.
Demand responsive services organized by charitable institutions with some public financial assitance exist in certain towns.	Buses are available at training and rehabilitation centres for disabled persons.	Persons confined to a wheelchair and unable to drive a car can receive a monthly allowance for taxi fares.	Special private taxi services for wheelchair users in Zurich, Geneva and St. Gall.	The great majority of disabled persons confined to wheelchairs receive a free car. Those unable to drive a car receive an electric wheelchair or up to FS 420 per month to cover taxi fares.	The cantonal and and muncipal authorities, under the direction of federal authorities, provide parking facilities for the disabled.	Driving licence is subject to medical confirmation of ability to drive.
Some services are provided by local authorities and voluntary organizations.	Free transport to hospital under NHS where disabled person cannot use public transit.	No special arrangement.	The design of a new taxi with provisions for disabled and wheelchairs is being undertaken by manufactures; prototype is expected in 1984.	Mobility allowance of £60 per month and related exemption from vehicle excise duty. 'Motability' to help disabled drivers and passengers to leas cars. Low cost loans for purchase.	Certain special parking privileges under the 'orange badge scheme'.	Unknown
In a recent survey, 77 percent of transit operators provided a special service, half operated their own and half contracted out.	Numerous special services operated by non-profit and other organizations for particular needs.	Quite a few cities have provided user-side subsidies for taxi services.	In 1974, a project was undertaken to create a fully-accessible taxi, specifications were drafted but production did not take place.	No special arrangements but a project is underway to look at a 'rental/lease' concept.	Up to local authorities.	Unknown

Adapted Transit

The disabled consumer movement's (as represented by the Coalition of Provincial Organizations of the Handicapped) central objectives for the disabled are independence and integration with the community. Integration implies a "co-mingling in day-to-day living processes with society at large, including as nearly as possible use of the comprehensive range of community services and facilities that are available and used by non-disabled individuals". This principle is manifested in COPOH's position with respect to transportation services for the disabled: transportation is a tax-supported system from which all should benefit; conventional transit services should be made accessible to the disabled to the greatest extent possible. Gaining accessibility to regular transit services as opposed to separate alternative services is seen by the disabled groups as a direct way of moving toward the desired kind of integration.

Integrated or adapted public transit implies several supplementary options depending on the degree of accessibility of the system and its facilities:

- Fully integrated implies full accessibility for all disabled persons on all vehicles and facilities and on all routes.
- Partially integrated implies some fully accessible vehicles and facilities and only on some routes.
- Partially accessible implies the removal of travel barriers throughout the system for only some disablement situations.

Option #1
ADAPTED
TRANSIT

Although the transit industry as a whole, in both North America and Europe, appear to be adamantly against the concept of full accessibility, several individual cities in the United States have decided to implement this option on a long term basis. Of 84 systems surveyed in a recent study in the United States (6), 35 bus service operators use lift-equipped buses for some portion of their regularly scheduled service, although only 18 percent of the buses are equipped with lifts. Seattle, for example, is fully committed to accessible fixed-route service. Although only 11 percent of the fleet is presently accessible, the service is carrying some 70 wheelchair passengers a day at an estimated cost of about $16.00 per trip (7). Only the cities of Victoria and Battlefords in Canada have attempted regular service with accessible fixed-route buses; Victoria's service was discontinued after the initial six-month demonstration project because of the high cost and low usage that resulted.

In Europe, most of the countries have adopted, or are experimenting with, measures to enable disabled persons, other than wheelchair users, to use regular transit services. These measures include larger door

openings, lower floor and step heights, careful placement of grab rails, courtesy seating, driver assistance, and better visual and audio information systems. The Swedish Transport Board, for example, has just issued directives covering steps, doors, grab rails, seats, signals, audio information, ventilation, flooring, lighting, and even non-allergic materials on buses (8). The same approach seems to be widely adopted in Canada, but on a much smaller and disparate scale. The Canadian Urban Transit Association, for example, is presently working on a policy paper that would provide some coordination for these efforts towards partial accessibility of public transit.

Very few rail systems in the world can be considered accessible for disabled persons. Notable exceptions are the rail systems in Washington, Atlanta, San Francisco, Amsterdam and Stockholm. The Stockholm T-Bahn has 94 stations, of which 62 are fully accessible. A new line on the Rotterdam Metro is also fully accessible. The London Transport Executive undertook an extensive study in 1980 concerning the cost-effective measures that could be introduced on the subway system for use by various disabled passengers (other than the severely disabled). In Toronto, after an extensive study, various measures have been implemented to assist various disabled groups such as the hearing/visually impaired; but no efforts are being made to make the system accessible to persons in wheelchairs.

In Europe, the adaption of conventional public transit service to the needs of the disabled has concentrated on the incorporation of measures aimed at a particular type of disablement situation within the context of the total transportation system; that is, the removal of travel barriers for a particular market segment from the point of origin of the trip to the point of destination. In the United States, the adaption of public transit has been oriented to the degree of incorporation of fully-accessible vehicles into the transit operation. In Canada, some efforts have been made to make the public transit service more accessible to certain market segments, notably the elderly, the hearing and visually impaired and those with learning limitations.

Special Services

Private rehabilitation and charitable organizations were among the first to introduce special services for transporting disabled persons whose mobility was reduced. Because they are highly adaptable to time, space and quality requirements, special services were an obvious solution to the problem and thus were long regarded as an excellent means of solving the transport problems of the disabled.

Special Services

Special services are generally demand-responsive transit services provided for individuals who cannot use conventional public transit. Usually, vans or small buses outfitted with lifts and wheelchair tie-down devices are used. Special services in themselves imply several more sub-options which are differentiated by the degree of public involvement in the system:

- Publicly-funded and publicly-operated in which the appropriate transit authority is responsible for the management, ownership and operation of the service (e.g. Winnipeg Handi-Transit).
- Publicly-funded and privately-operated in which the appropriate authority is responsible for ownership and financing but enters into contractural arrangements with private enterprise for the management and operation (e.g. B.C. Custom Transit Program).
- Privately-funded and privately-operated in which a private company is responsible both for raising the necessary funds and for operating the service (e.g. M&O Bus Lines in Ottawa, although funding is assured from provincial and municipal sources).
- Non-profit organization is responsible for funding and operation (e.g. SCCCA Special-Needs Transit, although funding is assured from provincial and municipal sources).

Option #2
SPECIAL
SERVICES

Special services appear to be the principle measure adopted by most countries to meet the transport needs of the disabled, especially those in wheelchairs. In Sweden, for example, all the 277 local authorities in the country operate a special service in some form or another (9). Sixty-six of 84 transit operators surveyed in the United States provide special, parallel services (6). In Canada, almost all municipalities over 10,000 population provide a special service (10,11), about two-thirds of which is contracted out to private operators or non-profit organizations.

Generally, provinces and muncipalities in Canada cost-share special services which are usually developed voluntarily by the municipality; the notable exception being the Province of Quebec which passed legislation requiring the submission of a development program for special services. British Columbia, for example, provides almost 70 percent of the cost of operating special services, with the municipality and the users providing the balance of the operating funds.

Indicative of the type of special service that can be provided is the Telebus system in Berlin. The Ministry of Research and Technology has been promoting the development of the Telebus system by investing approximately DM 50 million since 1978. This system transports persons suffering from severe impairments of their walking and standing functions and are therefore unable to use existing public transit

services. A door-to-door service is provided for these persons, including between home and vehicle. An investigation is presently underway to see if it would be more effective to have persons other than the vehicle operator assist passengers to and from the vehicle. One of the notable features of the Telebus system is the vehicle: the floor is so low that disabled persons in wheelchairs are able to enter the vehicle without entry-aids or assistance. The Telebus authorities felt that entry-aids (lifts, ramps) serve to emphasize the handicap of the disabled passengers, presenting awkward handling situations and slowing down the service.

Despite the widespread popularity of special services, due to changing perceptions of disabled persons in society and increasingly burdensome financial constraints, the effectiveness of special services has recently been challenged to some extent. Questions first arose out of the expressed concerns of disabled groups, and especially their attitude towards special services, and were later to hinge on the cost and organizational problems involved. Further problems are discussed in the following chapter.

Taxi Systems

When there are considerable financial or technical obstacles to the conversion of existing transit services or when the disabled population is spread over a wide area, many countries have found that problems can generally be alleviated by granting personalized financial assistance for private taxi service and that this is probably the least costly measure available. Other initiatives that have been undertaken to facilitate the use of taxis includes the investigation of shared-ride taxi systems, especially in the United States.

Option #3
TAXI
SYSTEMS

Several user-side subsidy systems have been introduced to facilitate the use of taxis by disabled persons, including the grant of taxi credit cards, transport vouchers, or transport (or 'mobility') allowances. Belgium, Denmark, Switzerland, Sweden, the United Kingdom and the United States seem to be among the most advanced in this respect.

In Stockholm, for example, there are 2,500 taxis and nearly 90 percent of all trips by disabled persons are made by taxi. Passengers travelling by taxi have to show a special personal account card. Since every taxi incorporates a device for debiting account cards, the data on these cards can be stored and evaluated by means of computers. At the present time, this procedure represents the basis for taxi payment, statistics, monitoring and supervisory measures. In 1980, the transport authority paid the taxi operators for 4.6 million trips, equiva-

lent to about 40 percent of the total volume of taxi traffic. The average fare per trip amounted to Skr. 59.00 versus a cost of Skr. 126.00 per trip on the special bus service.

In Australia, after several years of study, the government has decided to provide an integrated service on the existing taxi systems, rather than provide special transit services. An experiment was initiated in November 1981 with the aim of providing equal cost transportation for the 3 percent of the population that cannot use public transport. Over 2000 people are participating in the project in Sydney where 30 modified Toyota Urvans operate as part of the conventional taxi system. Liaison with potential manufacturers of a more suitable vehicle is being undertaken and it is hoped that a vehicle will be available for testing in late 1984 (13).

In the United States in 1974, a project was undertaken by the New York Museum of Modern Art to create one type of taxi vehicle suitable for all users (14). Several prototypes were built but none manufactured. In Canada, a prototype vehicle suitable for general use and also being accessible was also developed. The GSM taxi, as it was called, had several shortcomings: relatively high cost and unproven durability, user and operator acceptance. Although work is continuing in Canada (15), as a result of the International Year of the Disabled, the initiative has moved to Europe and the British Company, Carbodies Pty.Ltd, is now constructing prototype CR6 vehicles based on the Range Rover, to meet the multi-purpose goal of fully-accessible taxis.

Shared-ride taxi systems have been investigated in a number of communities in Canada including West Vancouver, North Battleford, Bathurst, Charlottetown, and Fort McMurray. Two systems are currently in operation: Peterborough Trans-Cab system and the Battlefords Taxi-Bus. In the United States, a very large number of shared-ride taxi systems are in operation and in California the shared-ride taxi systems have replaced the dial-a-ride systems as the predominant form of demand-responsive transportation (16). The difficulties in Canada in implementing shared-ride taxi systems appear to arise from the problem of finding a cooperative public/private enterprise relationship.

A simpler, more defined public/private relationship can occur by contracting for a specific amount of service and this has occurred in numerous instances in Canada. Both Toronto and Vancouver have part of their special services for the disabled provided by taxi operators. But, perhaps the most common form of using taxis is for social service agencies to contract with a taxi operator to provide service for a particular event, such as a workshop. In North Vancouver, a taxi operator was able to provide service for the mentally-retarded at a much lower rate than the previous bus operator.

Private Auto

Several recent studies (17) and surveys of actual trip-making behaviour clearly reveal a strong desire on the part of disabled persons to use cars adapted to their needs, providing that their finances permit. This is not surprising, considering the advantages associated with driving one's car -- not having to carry heavy packages, having access to a wider range of opportunities, going out in the evening or in bad weather. These factors enhance feelings of independence and self-reliance.

Given that disabled persons generally see the private auto as a means of gaining greater independence of movement and as contributing to their integration into society and given that a very high proportion of disabled persons are capable of operating a car given the necessary means with which to purchase and operate the vehicle, the private car is increasingly viewed as an effective way of providing transport for disabled persons.

Most countries feel that it would be illogical to seek deliberately to channel disabled persons unable to move about unaided towards special transit services when they can drive their own car, since this would in fact lessen their independence and work potential. Measures which might encourage the use of cars by disabled persons are therefore being adopted by many European countries.

Option #4
PRIVATE
AUTO

The measures vary considerably. In fact, since personalized aid is readily adaptable, widely varying requirements can more easily be met. Measures range from financial aid to adapt motor vehicles to research into means whereby a disabled person could signal for help from within the vehicle when needed. Other measures are designed to enable persons to park their cars more easily or to fit more smoothly into the flow of traffic.

Facilitating the use of the private auto for disabled persons implies several sub-options:

- Financial assistance such as mobility allowances, tax exemptions, low-interest loans, grants and subsidies that would allow individuals to acquire automobiles adapted to their own needs.
- Institutional assistance such as the establishment of special driving schools, rental/leasing services with special vehicles for the disabled at subsidized rates, provision of special parking places, development of mobility clubs, and so forth.
- Technical assistance such as the development of adaption devices for private autos (some are even available for motorized wheelchairs), special vehicles and other assisting devices.

Private Auto

Countries that provide some sort of financial assistance for the purchase of private autos by disabled individuals include: Austria, Belgium, Denmark, Germany, Irleand, the Netherlands, Sweden, Switzerland, and the United Kingdom.

Measures undertaken in Belgium are probably indicative of the type of personalized aid being provided in European countries. The Centre d'Adaptation a la Route pour Automobilistes Handicapes (CARA) is managed by an association of motor vehicle inspection agencies. Disabled persons, advised by CARA, take lessons at a driving school and take the driving test with a specially equipped vehicle that CARA makes available to the driving school free of charge. The Fonds National pour le Reclassment Social des Handicapes refunds the costs incurred by a handicapped person to convert his or her vehicle as needed.

In Canada, presently, special adaption devices for private cars such as hand controls are exempt from federal sales and excise tax. Other measures that have been investigated include 'mobility clubs' or group use of private autos and the provision of reserved parking spaces for the disabled with private cars. There is also a special driving school in Port Credit, Ontario for the disabled.

The private automobile option encompasses both the self-driven vehicle and the private vehicle driven by someone else, usually a friend or relative. The latter is a common travel mode for many of the disabled group; facilitating this means of travel could be an important part of an overall program for resolving the transportation problems of the disabled.

3. TRANSPORTATION ISSUES

Any consideration of the transportation problems of disabled persons is overwhelmed by the variety and complexity of the issue. The disabled group differs considerably in the severity and extent of their needs and the service options available for transportation are numerous and laden with a wide variety of problems which limit their effectiveness.

Urban transportation for the disabled is not only a problem of accessibility, it is a problem of availability of services, attitudes of service providers, personal financial resources, comfort and convenience, safety and security, service organization, operation and equipment. Most of all, it a problem of understanding.

The transportation problems of disabled persons can be traced, to a considerable extent, to sometimes misunderstood, often conflicting, objectives and concepts of integration, human rights and transportation efficiency and cost.

The objectives of integration in the conventional modes of urban transport on the one hand, and the supply of special services to expand travel opportunities on the other, raises conflicts between transportation viewed as a final demand, and the more traditional view of transportation as a demand derived from the pursuit of other activities.

A great many transportation measures are available to meet the needs of the disabled; at the same time, their needs vary enormously, depending upon their particular functional limitations and preferences.

If efficient transportation is an objective, no single measure or market segment (e.g. wheelchair users, visually impaired persons) would seem to be suitable for policy determination. Yet if human rights serves as the sole concern, a large number of measures are of necessity eliminated from consideration, and measures and needs cannot be effectively matched.

These conflicting objectives, representing the disagreements prevalent between service providers and consumer advocates, have led to a number of transportation problems for the disabled.

Institutional Constraints

Constraints associated with funding sources, directives from political officials, institutional policies, structural/organizational fragmentation and cooperation and coordination, or the lack thereof, often interfere with the rational provision of transportation services for the disabled population.

Service Fragmentation

Service fragmentation and lack of coordination are increasingly being viewed as major problems, especially by the disabled groups themselves. In fact, special transit services for the disabled are even viewed by some as major obstacles in setting up a comprehensive and consistent transportation service.

That such a problem exists at the local level is not surprising. The array of special transportation services which currently exist in each community emerged from years of isolated development by social service agencies and other community groups with different and often contradictory service objectives. Now firmly established, these services developed their own constituencies, their own policies, and their own bureaucracies. Their action, more or less based on charitable grounds and through frequent recourse to voluntary schemes, have often been lacking in consistency.

This kind of organization clearly has a number of positive features, as attested by its rapid growth. By basing the organization of special services on action taken by a large number of social service agencies, the particular requirements of disabled users can be closely matched. Since these providers are generally small and their area of operation is limited, they are sensitive to the requirements of their clientele.

Funding Constraints

Another issue of importance is funding constraints. Particularly at the outset, transit services for the disabled have been shaped very much by the availability of funds and constraints associated with the funding programs. The greatest impacts have been on fleet size and eligibility. Tied as they were to rigid funding restraints, the majority of special services operated on a subscription-only basis, often serving the clients of a single social service agency. Because of the almost 'fixed-route' nature of this service, many operating functions and characteristics common to more elaborate systems did not develop.

System stability is an issue related to the funding constraints. It refers to the need, expressed by consumer advocates, to incorporate the special service for disabled persons as a part of a socially important service, such as public transit, that is maintained even during periods of fiscal constraint -- not a fringe service that is easily removed.

Delivery Mechanisms

With respect to the actual delivery of special services in Canada, concern has often been expressed about public versus private operation. Larger Canadian communities seem to prefer contracted operations with private companies specializing in this form of transportation while smaller communities have a preference for the more direct type of supervision which is accorded by a municipal department or commission operating the system (10).

Consumer advocate groups have often expressed a desire to have special services as a part of the regular public transit service (as is the case in Winnipeg). There is little evidence to date, however, that private operation is any less competent, responsive or efficient than publicly-operated systems. Both types suffer a certain amount of administrative, management and driver training deficiencies. A recent analysis (18) found that public operation with union labour often "bears a mystique not entirely consistent with practical experience".

Another issue is related to the view that social service agencies operating special services are apt to maintain their clientele in a closed environment. For example, they may want to use related rehabilitation facilities and thus fail to provide enough access to other opportunities. The disabled persons may end up being enmeshed in a web of interconnecting forms of aid. A limited view of the type of

assistance most beneficial to disabled persons can often result. It is also not certain that social service agencies have the skills and training necessary for operating an efficient transport service.

Availability of Service

The effect of funding constraints is manifested the most in vehicle availability. Fleet size is by far the most common ride-limiting factor on special services (18), although reservation procedures, eligibility constraints, trip limits and priorities, and reliability of service all act as constraints in the use of transport services.

In Canada, there is not enough experience to know what the ultimate demand might be for such services, although it is probably true that the available service does not come near to meeting the demand. The availability of service is seriously affected by the number of vehicles. In the United States also, the availability of service on fixed-route accessible bus services is seriously affected by the number of lift-equipped vehicles in service, the number of routes with lift-equipped buses, and the frequency of lift-equipped buses on those routes (19).

Service Levels

A related issue is the question of whether or not special services provide a higher level of service than public transit due to its curb-to-curb, demand-responsive and more personalized type of operation. There is no question that this feature is desirable, nor is there any question that for some disabled individuals it is essential in order for them to utilize a public transit service (20).

However, the cost of supplying such services has proven to be so high that restrictions have had to be placed on demand. All of these restrictions have been cited as examples of the lower level of service that is provided by special services. They have also been cited as examples of denying equal transit service to individuals solely on the basis of their disability.

Service Restrictions

Virtually all special services require that trips be planned at least 24 hours in advance (Calgary, offering on-demand service, is a notable exception), and some require that trips be planned 2 to 3 days in

advance. All have eligibility constraints and certification procedures which require disabled individuals to be certified in advance by a doctor or an agency. Many also have trip-purpose restrictions or 'prioritization' procedures which eliminate or discourage certain trips. Others are restricted in service area and make it difficult to take trips of the same length as the regular transit system. In addition, some charge a significantly higher fare than the regular public system.

Another problem related to availability of service is the lack of information about the service. Disabled users frequently experience difficulties in learning whether or not they qualify for service, whether it is beneficial to their needs, and if so, how to make use of it.

Accessibility of Service

Vehicle accessibility and the problems experienced by the severely disabled in getting on and off a vehicle are viewed as some of the most critical aspects of transportation service by the disabled who are in a wheelchair and who have severe problems in climbing steps.

Vehicle Accessibility

In order to overcome the disparity between road and vehicle floor levels, ramps, hydraulic platforms or pivoted lifts are usually employed. One essential disadvantage of such methods is that disabled persons are not able to enter the vehicle without help from others. This in turn leads to attitudinal problems -- entry aids serve to emphasize the disablement situation. Another drawback is awkward handling of such aids and the loss of time in operating the service. Wheelchair lifts, nonetheless, are useful to 6 to 20 percent of the disabled population (depending on whether nonwheelchair travellers are included).

Other problems of accessibility for the less severely disabled have received less attention. Mobility limitations prevent some travellers from placing money into the fare collection device. Although this problem arises on buses, it is more significant on rail systems where the inability to pay through the fare collection device will either prohibit entry or exit.

Many disabled travellers have difficulty in standing on moving buses and maneuvering through crowded vehicles when boarding or alighting.

Accessibility of Service

Practices already being implemented on public transit systems such as reserved seating and limiting exits to only the rear door represent efforts to buttress feelings of control and manageability by easing the stress of crowded situations. Some systems require the driver to wait until all disabled travellers are seated before leaving a stop. This later practice requires more slack to be built into the schedule.

Many options undertaken to improve the accessibility of conventional transit services, especially for the hearing/visually impaired have a positive impact on other travellers. Toronto, for example, has recently undertaken a number of measures to increase the information available and the safety for its hearing and visually impaired passengers. These measures generally provide additional assistance for the 'invisible' disabled, many of whom appreciate the additional information systems and consideration by transit staff.

Safety and Security

On special services, since the vehicles are often converted trucks or buses, the question of safety and security for the passengers often arises. On conventional transit services, where accessibility is provided for wheelchair passengers, the issue of safety for all passengers in an emergency arises.

Wheelchair tie-downs and their location on the vehicle have been an enigma to numerous systems. Lifts are also a problem. Some don't have reliable safety bars, or safety bars at all. On the vehicle, some officials believe in the extensive use of safety bars while most systems feel that these bars are either unnecessary or dangerous, and that passengers can use the backs of seats to negotiate from one to the next.

The Province of Ontario was one of the first provinces to recognize the problems with safety and security and issued stringent regulations which became effective September 1, 1981. Other provinces are beginning to follow suit.

Environmental Barriers

Aside from the vehicle accessibility, there is also the more general problem of getting to the vehicle. With a lift-equipped conventional service, the accessibility of stops along the route can represent a problem. If a special service operates only curb-to-curb service, the disabled traveller may face additional barriers. Many streets do not have curb cuts, and access to may buildings is unsatisfactory.

Attitudinal Barriers

Attitudes and emotions, of both the disabled traveller and the service provider, present problems to the use of transportation services.

Emotional Barriers

Many people have fears about becoming lost or abused during travel on transit systems. Disabled persons are no different, they fear being in distress with no aid available and being disoriented with no one to offer advice. In a recent study of the Washington accessible rail transit system, it was found that many stations were not staffed, elevators for the handicapped were locked, signals and visible directions were inadequate, special turnstiles for the disabled were broken, and the assistance promised the disabled on the system was generally unavailable (21).

These emotional barriers to travel, which are often based on experience, are difficult to overcome if the transit system lacks the resources or the willingness to deal with these problems. Transit familiarization sessions for the disabled are being provided by some agencies, with the intent of allaying the fears expressed by some travellers.

Driver Attitudes

Driver attitudes toward disabled passengers is often mentioned by disabled groups in any consideration of the problems facing the disabled in transit system travel. Rider/driver sensitivity training and passenger outreach are programs that are often lacking in special or conventional transit operations.

Transit Management

Special services are often operated by social service agencies or private companies without the requisite transit management skills that are deemed necessary to provide an efficient service. In the case of transit managers operating the service, the requisite social service skills may be lacking. In either case, the consumer often states that the management of the special service is unable to recognize the issues and problems that the user sees.

In an attempt to rectify this problem, advisory boards are used by the majority of special services in Canada. These boards set guidelines for the operator and the user, but only one (Vancouver) has

allowed users to nominate representatives to the advisory board and only four advisory boards (out of 40) are allowed to make minor policy decisions (10).

Efficiency Conflicts

One of the critical issues in special service operations is the trade-off between efficiency and effectiveness. In conventional public transit, improvements in efficiency and effectiveness often go hand in hand. Special services operate very differently: each additional passenger carried increases the ride and wait times for existing passengers (as efficiency is increased, effectiveness goes down).

Trade-Offs in Efficiency

The inescapable reality of special services is that, if they are to be more effective (i.e., reduced eligibility, better response time, etc.), they will also tend to be less efficient and consequently more expensive. The trade-offs between the two, and the balance desired has been a local community policy decision.

The adaption of conventional fixed-route transit services also runs into efficiency conflicts. Attempting to make these services accessible to severely disabled persons is contradictory to the transit authoritites' concerns for improving the efficiency of the service for the general public. The universal tendency to operate transit services in such a way as to carry the maximum number of passengers at least cost, notably by faster turnaround of vehicles and mechanization of ancilliary services such as automatic ticketing and gates, works against the interests of disabled persons.

The Issue of Costs

The issue of costs of the different options to transportation for disabled persons is complex and controversial due to the difficulties inherent in: (1) estimating the costs involved and (2) estimating the demand for services. Costs are considered further in the following chapter.

4. ASSESSMENT OF OPTIONS

The assessment of alternative policy options with respect to transportation for disabled persons is characterized by widely divergent views between service providers and consumers and the complexity of policy analysis when the real domain of the issue is unclear, e.g., transportation policy or human rights policy. Other issues concern the objective assessment of needs as opposed to demands made by disabled groups and the possible impact that a policy aimed at a particular market segment may have on other market segments.

The analysis presented here reflects the difficulties inherent in developing sound policy in an area characterized by basic disagreements between the service providers and intended patrons, a lack of knowledge of the many service options available, and a scarcity of reliable information regarding costs of service as well as the nature and prevalence of needs.

This assessment of alternative policy options attempts to illustrate the range of alternatives possible while, at the same time, providing an appropriate focus for policy analysis. Each option is comprised of a number of components that are both complementary and supplementary. It is the particular synthesis of these components that help to define and focus the particular option.

By defining the options in this way, it is not the intent to eliminate any particular measure, but rather just to stress the orientation of the mix of measures that could be undertaken and the market groups that would be affected by the option. The assessment is illustrated in Table 5 and discussed in the following sections.

Table 5: Assessment of Transportation Options for the Disabled

SERVICE OPTIONS		MARKET SEGMENTS	MAJOR REQUIREMENTS	OBJECTIVE ACHIEVEMENT			
				COST-EFFECTIVENESS (Usage Per unit of Cost)	SOCIAL INTEGRATION (Access to Opportunities)	PERSONAL INDEPENDENCE (Degree of Self-Control)	FREEDOM OF CHOICE (Existence of Services)
ADAPTED TRANSIT	FULLY INTEGRATED		- Fully accessible public transit system (including buses, rail cars, and stations)	LOW	MEDIUM	LOW-MED	MEDIUM
	PARTIALLY INTEGRATED		- Selected elements (certain routes, vehicles, stations) of transit system fully accessible	LOW-MED	LOW	LOW	LOW-MED
	PARTIALLY ACCESSIBLE		- Fully accessible for certain market segments only (eg. hearing/visually impaired)	MED-HIGH	LOW-MED	LOW-MED	LOW
SPECIAL SERVICES			- Special fully-accessible vehicles providing demand-responsive service to eligible clients	MEDIUM	MEDIUM	LOW-MED	LOW-MED
TAXI SYSTEMS			- Financial assistance to users and technical assistance to operators to adapt vehicles	MED-HIGH	MEDIUM	MEDIUM	MEDIUM
PRIVATE AUTO			- Financial assistance to users to enable them to adapt their own private automobile	HIGH	HIGH	HIGH	HIGH

ADVANTAGES	DISADVANTAGES	EXAMPLES
- Allows disabled persons to have access to the same transit service as the general public. - Promotes integration of disabled persons into society and acceptance by society of disabled persons. - Has a low marginal cost of increased patronage. - Provides an equivalent level of service.	- Cost-effectiveness is questionable, experience indicates that it can be very high. - Access to opportunities is limited to the same degree as all fixed-route services. - Many users have no desire to use fixed-route services. Experiences low usage and high seasonal fluctuations. - Experiences safety, boarding, other problems.	- Bridgeport, Conn. - Palm Beach, Calif. - Wichita, Kansas - Washington Metro - Atlanta Metro - Amsterdam Metro
- Allows disabled persons access to some of the same transit service as the general public. - Promotes integration of disabled persons into society and acceptance by society of disabled persons. - Low marginal cost of increased patronage. - Provides an equivalent level of service where the service is provided.	- Availability of service is dependent on the degree of integration which would be highly variable for extended periods. - Doesn't provide a total system of movement from origin to destination. - Could be confusing for passengers, especially strangers. - Cost-effectiveness is very questionable.	- Seattle, Wash. - St. Louis, Mo. - Detroit, Mich. - Los Angeles, Calif. - Washington, D.C. - Rotterdam Metro - Stockholm T-Bahn
- Allows independent (self-sufficient) disabled persons to have access to public transit. - Promotes integration of some disabled persons into society and acceptance by society. - Generally low capital and operating commitments are required. - Techniques that are used are generally useful to the general public as well.	- Requires consideration of the total system of movement from origin to destination for a particular market segment. - Presently, lack of research, development and commitment to various adaption techniques.	- Toronto Subway - Sweden - Netherlands - Germany - France
- Provides 'door-to-door' transport service (a total system of movement), increasing the number of available opportunities. - Relatively easy to implement with low capital and start-up costs. - Most cities presently have a special service. - Flexibility is inherent to adjust service levels as required.	- Inherent ride-limiting factors due to reservation procedures, eligibility constraints, trip priorities, etc. - Requires considerably more management experience, skills and commitment than at present. - Experiences vehicle, equipment and driver quality problems. - Funding is presently inconsistent and subject to cut-back (as is all transit services). - Requires better management and driver training and better equipment.	- Berlin, Germany - Stockholm, Sweden - Brussels, Belgium - Vancouver, B.C. - Calgary, Alta. - Regina, Sask. - Winnipeg, Man. - Toronto, Ont. - Gothenburg, Sweden - The Netherlands
- Provides 'door-to-door' transport service (a total system of movement), increasing the number of available opportunities. - Low capital and start-up costs. - Provides integration of disabled persons into an existing form of transportation.	- Driver training and vehicle design are presently considered inadequate. - Some policy and institutional initiatives are required which are the responsibility of municipalities. - Has a high marginal cost of increased ridership. - Requires considerable administrative commitment. - Presently can't be used very well by disabled persons in wheelchairs.	- Sydney, Australia - Stockholm, Sweden - Brussels, Belgium - Toronto, Canada - Austria - Germany - Netherlands - United Kngdom
- Provides considerable convenience for disabled persons and allows for complete independence. - Allows access to the widest range of opportunities for the disabled.	- Some research and development is required as to funding mechanisms, policies and technology. - Probably difficult to administer the necessary financial and technical programs. - The proper method of application of this option is unclear.	- Austria - Belgium - Israel - Ireland - Germany - Netherlands - Sweden - Switzerland - United Kingdom

Cost-Effectiveness

Since one of the basic problems underlying the need for transportation for the disabled is their difficulty or inability to make desired trips at present, the number of disabled persons who will desire and be able to use each service option is an important indicator of effectiveness. The most straightforward indicator of cost-effectiveness and economic efficiency is then cost per passenger trip.

There has been considerable uncertainty about the relative efficiency of accessible transit versus separate services due to the lack of complete data on costs and difficulties in predicting ridership responses. The amount of new ridership is an especially critical factor because it affects cost differently. With the fixed costs of accessible transit, it might be expected to be more cost-effective with very high usage by disabled persons, and separate services might be more efficient with lower usage.

Based upon cost estimates from the United States (22), total service cost for accessible fixed-route transit appears to be in the vicinity of $2000 (U.S.) per year per accessible bus. The cost per lift-assisted passenger trip, therefore, depends on the frequency of utilization of the lifts. Most transit operators providing accessible fixed-route services are experiencing low levels of lift utilization and high seasonal fluctuations in usage (an important point in Canada with its severe winter conditions).

The cost per boarding varied from $16 in Seattle to $1293 in Detroit with an average of 14 cities being $265 (22). In Seattle, since only 72 users were identified that actually used the accessible service, the annual cost per unduplicated user is $4500. The estimated cost for accessible rail systems is relatively comparable. The estimated cost, from a recent study in the United States (23), per trip on light rail and heavy rail systems is $30 and $103 respectively.

For special services in Canada, it was found that overall on average each trip by a disabled person costs $8.76 while each hour of service costs about $18.47 (10). Based on information derived from Vancouver (24), the cost per registered user is approximately $400 per year.

A Congressional Budget Office study undertaken for the United States Budget and Transportation Subcommittee attempted to confirm these observations by considering current modal choice preferences in developing estimates of cost-effectiveness and it concluded (25):

> "To serve the travel needs of handicapped persons through modifications to mass transit systems would appear to be more costly than

to provide specially tailored services. In particular, plans such as the Transit Plan (a scenario equivalent to putting wheelchair lifts on fixed-route transit coaches) built around regulations issued by DOT to apply the provisions of Section 504, show not only higher total costs but also higher costs per trip than do plans that rely on specialized door-to-door services and adapted automobiles."

Although the Congressional Budget Office study has received criticism from both the American Coalition of Citizens with Disabilities (20) and the U.S. Department of Transportation (26), it did attempt to provide an objective assessment of various alternatives as shown below:

Table 6: Estimated Cost-Effectiveness of Various Options (CBO Study)

Option	Total 30-Year Cost (billions)	Percent of Disabled Population Served	Cost Per Disabled Person Trip
Transit Plan (full accessibility)	$6.8	7%	$38.08
Taxi Plan (special services)	$4.4	26%	$ 7.62
Auto Plan (mix of services)	$6.3	43%	$ 7.33

The two major criticisms from the U.S. Department of Transportation with respect to the above figures were: (1) the cost for the Transit Plan was too high due mainly to the inclusion in the study of about $2.0 billion for fleet expansion for lost capacity, and (2) the estimated ridership by disabled persons for the Transit Plan was too low. The ACCD study (20) found disagreement with many of the assumptions and the cost and ridership projections in the CBO study, but offered no overall analysis that could be used for comparison with the above table.

In spite of the fact that there is no universally-accepted document outlining the cost-effectiveness of the various options (and it is beyond the scope of this report to try and develop such figures), it is believed from the evidence presented and for Canadian conditions that the most cost-effective option is a combination of inexpensive adaptations to buses, supplementary demand-responsive services, subsidized taxi services for some disabled persons, and the provision of capital assistance to some severely disabled persons to purchase specially adapted automobiles.

Social Integration

Another of the basic problems of transportation for disabled persons is the concept of integrating them into society.

Social integration of disabled persons is essential to the healthy attitudinal development of society as a whole. Disabled persons should not be segregated from the mainstream of society, nor should society be segregated from those who suffer personal disabilities. It is a two-way educational process: the approximately one million disabled persons must become a normal part of society, and the other ninety percent of the population must learn that disabled persons are indeed co-equal participants in this society.

Current attitudes towards social integration, the highly diversified requirements of disabled persons, and the economic constrairts of public finance indicate the need for a comprehensive mix of urban transport options. To make travel easier for disabled persons and thus enable them to share in community life, no individual transport mode should be completely excluded as this tends to exclude particular segments of the disabled population.

In assessing alternative policy options, consideration has to be given to the effect of choosing a particular option on all of the disabled population. Measures to improve the mobility of one particular market segment will undoubtedly have a negative impact on another market segment. As the Congressional Budget Office stated, in comparing accessible transit to special services (25): "There is no question however that either approach is very costly, and that pursuing one would reduce the financial means available to pursue the other".

Separate transit services, for example, are a cost-effective means of transport for some disabled persons. They fulfill certain types of requirements fairly well, such as travel to and from places of work, study or medical treatment. Yet they still meet only specific needs. It is proposed that accessible transit would also only meet certain needs and thus not contribute to the social integration of all disabled persons since only a small percentage of the population use this mode in comparison to the automobile. Providing access to opportunities for as many different disabled persons as possible should be the main criteria of the objective of social integration.

Separate transit services as a supplementary service to public transit, private cars and taxis is therefore considered a better option for achieving current open-society objectives as well as meeting the desires of the broad range of disabled travellers who may prefer various alternative modes of transport.

Personal Independence

Despite the wide variability possible in both individual and situational characteristics, the consistent finding of a variety of transportation studies (27) is that disabled persons are most satisfied with transportation that offers the greatest opportunity for independence and self-reliance.

Of course, the amount of independence one experiences with any type of transportation may vary depending upon both the individual and the particular operating characteristics of a given mode. The reliability and, hence, the predictability of one type of transport may be considerably greater than that of another type. Other factors such as timing, frequency, and duration of trips are also important and it is these characteristics that vary among the different modes of transportation. Clearly, there is more to transportation than merely being conveyed from one point to another.

It does not seem unreasonable to suggest then, to the extent that individuals can determine the timing, duration, and frequency of their trip-making, the greater self-reliance and independence they will feel. Similarly, the less control over and prior knowledge they have over these events, the more constrained and dependent they will feel.

Driving a private automobile allows an individual to have considerable control over his or her environment. Being an automobile passenger provides less control. Taxis and demand-responsive transit services are not as flexible as driving oneself but are more flexible and, consequently, more controllable than regularly-scheduled buses.

It appears that the advantages associated with driving one's own car are factors that enhance feelings of independence and self-reliance and explain the preferences for driving by disabled persons. Similar factors may also explain their preference for other mode choices, such as family-provided transportation over services provided by other agencies.

If having personal transportation is related to stability or positive changes in independence, self-reliance and life satisfaction, then it seems reasonable to infer that every effort should be made to help disabled persons to help themselves, even if it takes form as a specific program to help disabled persons obtain personal transportation.

In any case, a policy option that enhances the use of private cars and taxis in conjunction with separate transit services is viewed as the better option from the point of view of promoting independence and self-reliance of disabled persons.

Freedom of Choice

Adopting a policy of integrated accessible public transit implies a view of transport as a public utility, a minimum level of which is to be supplied to all irrespective of their desire to use it. Application of choice theory and allowing freedom of choice takes quite the opposite tack -- that individuals know what is best for them, and that policy is made on grounds of consumer desires, corrected for possible resource considerations, and possibly weighted according to income effects.

Allowing freedom of choice then implies a provision of a variety of measures to improve the mobility of disabled people. It also implies that these measures are such that individuals feel that they have a choice. And this will occur if the alternatives are seen as equal in quality to other modes.

Equality, of course, is open to broad interpretation. Some argue that separate services provide a better quality of service then fixed-route transit and others argue the opposite. It is proposed, however, that if an equivalent level of service could be satisfactorily defined, then separate services for the disabled would not constitute discrimination under existing human rights legislation.

A recent study by the United States Congressional Budget Office (28) attempted to compare service quality offered by different passenger transport modes, considering the relative importance that consumers attach to different modal characteristics such as walking, waiting, riding and so forth. Various service standards were derived that would leave consumers indifferent as between fixed-route transit and separate services. The major points made were that, for separate services, there should be no restrictions on trip purpose, the fare should be equivalent to regular transit, and advance booking time should be reduced to about four hours.

Viewed in this context, if a policy option that enhances the use of private cars and taxis in conjunction with separate transit services is the preferred option, then considerable effort has to be undertaken to ensure that these alternative transport services are equal in quality to those enjoyed by the general public.

5. RECOMMENDED ACTION

Policy analysis requires focus. Often policy development for urban transportation for the disabled has focused on the alternatives of integration through making regular transit accessible versus the provision of separate specialized service. Another alternative is the facilitation of personal choice and independence through more individual aid. Each alternative is a simplified representation and must be considered in the light of the wide range of possibilities that exist for alleviating the travel problems of the disabled.

Policy analysis requires clarity. Policy development for urban transportation for the disabled is characterized by considerable complexity when the real domain of the issue is still controversial, e.g., transportation policy or human rights policy. Other issues that complicate the analysis is the objective assessment of needs as opposed to demands and the possible impact that a policy aimed at a particular market segment may have on other market segments.

Policy analysis implies a choice. The individualistic nature of existing measures of transport for the disabled, however, reflects the difficulties in finding cost-effective and acceptable solutions to the needs of the disabled. The problem does not appear to be a simple choice problem. Choosing one option should not necessarily preclude elements of another option. To do so is to preclude specific segments of the disabled population.

Despite the difficulties inherent in the assessment of alternative policy options for transportation for the disabled, a general conclusion is derived nonetheless.

General Conclusion

The general conclusion is that:

> If the aims of social integration, personal independence, human dignity and freedom of choice are to be combined with the existing objective of cost-effectiveness, then it would seem that the preferred policy option would be to emphasize the use of more personal forms of transportation for the disabled.

Neither policy of emphasizing accessible fixed-route public transit or special demand-responsive services is effective or efficient. It is proposed instead that a comprehensive mix of services combined with greater emphasis on private modes of transport would benefit disabled travellers more in terms of not only efficiency and mobility but also in terms of social integration, independence and freedom of choice.

The recommended policy action does not necessarily eliminate separate services from consideration but instead proposes that separate services be considered only as a supplementary service to such conventional modes of transport as private cars and taxis. The recommended policy also presupposes that public transit will continue to be adapted to a certain extent to meet the needs of the ambulatory disabled.

In summary, the proposed transportation policy is that a variety of transport services be encouraged, but with the primary focus being the private automobile, and the proposed human rights policy is that these services be comparable in quality to the services available to the general public.

Recommended Programs

Given that the preferred policy options may not always coincide with available options, it is important for policy-makers to be aware of the elements within the preferred options that make them appealing and desirable to disabled persons and they should strive to build these elements into any transportation program for the disabled whenever possible.

It is suggested, therefore, that programs developed by the Federal Government should be oriented towards understanding and promoting improvements of elements of the total transportation system for disabled persons rather than relying on a few ostentatious measures which may only assist a few users; the latter approach being the one

undertaken by the United States Department of Transportation with the Section 504 Regulations.

Programs for improvement of urban transport service for disabled persons would, therefore, include programs for taxi services, private automobiles, separate transit services, and even conventional transit services. It would also include programs for the hearing and visually impaired, persons with impaired coordination or ambulation, persons with impaired reasoning ability, as well as the wheelchair user.

Some proposed programs are outlined in the following paragraphs.

Market Understanding

Very little is known about disabled persons whose mobility is limited and even less concerning their attitudes towards urban transportation. Clearly, if reliable information on urban transportation for the disabled is to be obtained which could lead to effective action, far more sophisticated survey and market research techniques have to be used. Accurate assessment of the needs of certain categories of disabled travellers calls for information not only on the particular disability but also on the subject's past and present lifestyle and consequent social needs.

The concept of social needs requires emphasis in that it implies a normative judgement, i.e., needs can only be defined by a person or group in respect of another person or group. Individuals or groups making value judgements about themselves are simply expressing their 'wants'. Wants may or may not be a part of needs.

Recent research on these lines shows, for instance, that elderly people's behaviour is largely influence by the way other sections of society see them. It is because of the popular tendency to lump all old people together that they do, in fact, react in a certain way.

A study to develop an understanding of the market must include all components of the disabled traveller's lifestyle, and the various market segments must be seen as entities with as social status of their own, as perceived by other sections of society, and as perceived by themselves.

The study could also include the development of an understanding (and the dissemination of information) on aids and techniques used by various segments of the disabled population that would make urban transportation systems more accessible.

Recommended Programs

Management Development

The operators of special transit services in Canada are relatively new to the transit operations role, especially the operation of this kind of service. Transit management for special services has to involve two aspects: social service and transit operations. Effective special service management results from a blend of social service responsibilities with modern public transit management techniques.

The need for more and better application of transit management techniques is acknowledged, especially by many of the special transit operators themselves. The Canadian Urban Transit Association is undertaking to provide a forum for these operators, but more effective information dissemination is required which would result in the adoption of better management techniques by the operators.

A long term objective of this proposed program would be the design and implementation of specific courses or a series of seminars at institutions of higher learning or trade schools that would include transit management techniques for operators of special services. The course could be developed as an adjunct to other transit management courses being considered by the Canadian Urban Transit Association for an 'Institute of Urban Transit'.

In the interim, an operating manual should be compiled for special transit operators -- much like those currently available for regular transit services. The manual would probably be in a loose-leaf binder, allowing for continual updating, and would include information on management, planning, labour relations, customer relations, dispatching techniques, and other technical information, as well as specific information on the market served.

Another related program would be the development of a driver training program specifically for drivers of special transit services. Such a program would provide information on passenger handling techniques and the understanding of passengers' mobility requirements.

Technology Development

The incorporation of existing taxi operations into special transit services for the disabled offers a low cost and effective solution to some of the mobility problems of the disabled.

The taxi industry presently plays an important role in providing transportation to many persons who have a great difficulty in using public transit. The taxi industry should be encouraged to play a

more active role in the transportation of disabled persons.

In Sweden, for example, taxis carry almost 90 percent of all trips by disabled persons and, in fact, 40 percent of all taxi trips are by disabled persons on a subsidized fare basis. In Australia, the government policy is to integrate disabled persons onto the conventional taxi system rather than to provide a separate transit service.

Given that some cities in Canada, such as Toronto and Calgary, use taxis to serve disabled travellers, it is propsoed that more work should be undertaken to investigate the possibilities of using taxis as a complementary and supplementary service to special transit services. Some efforts have been expended in this respect in Canada, but overall the efforts are very small compared to the Swedish experience with computerized dispatching, billing and accounting, for example.

Although this would entail more communication with the taxi industry, and more cooperative planning, it is an area requiring more focus and direction on the part of the responsible governments. It is proposed that the role of the federal government would be to develop the appropriate technology for use by taxi systems. Thus, further investigation and demonstration of the GSM taxi vehicle is envisaged as well as liaison with English and Swiss manufacturers. Other applicable taxi technology that warrants demonstration and development would include new payment methods such as the credit card system used in Stockholm and Goteborg.

Personalized Assistance

At present, the alteration of automobiles can be financed under the Canada Assistance Plan or the Vocational Rehabilitation of Disabled Persons Act for students who require cars for educational purposes. A demonstration project would be useful to determine further how personalized assistance such as this can improve the mobility of disabled people through the provision of accessible vehicles.

A number of issues would have to be resolved in designing this demonstration: type of training required for users, insurance and liability problems, licensing problems, eligibility requirements, and method of financial support. A study would be required to determine if the program should offer financial support for modification of privately-owned vehicles or provide for the short or long-term lease of publicly-owned vehicles.

Since program costs would be dependent on the number and type of dis-

abled persons permitted in the program, eligibility rules would have to be investigated. Eligibility could be restricted to: persons who use wheelchairs permanently, only those disabled persons who work, or those people who cannot use public transit. Finally, eligibility could also be dependent on the recipient's willingness to provide transportation to other disabled people.

The evaluation of the demonstration program would need to determine the degree of increased tripmaking and attendant improvement in independence of disabled persons who can drive. Costs would be compared to providing comparable level of service on special transit services.

Other Possible Action

Other programs that could be undertaken to provide assistance to disabled travellers are outlined below:

1. An extensive review of options for adapting and improving conventional transit services to make them easier for disabled persons to use in order to produce guidelines similar to the Swedish Transport Board's directives for adjusting public transit to the needs of the handicapped.

2. The definition of a set of operating guidelines (eligibility, trip priorities, policy on attendants, reservation procedures, etc.) for special transit services that would ensure equity with conventional public transit (based on the work of Dennis Cannon and David Lewis in the United States in this respect).

3. Implement a demonstration project involving special measures on public transit systems to assist people with visual impairments. For people with hearing impairments. For people with learning limitations.

4. Test the applicability of a system of 'helpers' as is being considered for the Berlin Telebus to improve the productivity of special transit services and increase the quality of service provided.

5. Test the market acceptance of permitting non-disabled persons to use special transit services for a premium fare, possibly in a small town.

6. Test marketing and communications strategies for informing disabled people about special transit services.

7. Develop programs for consumer training for special transit services and for conventional transit services.

8. Test the idea of a pass mechanism that would permit visitors to use special transit services (encourage the concept of reciprocity on special services).

9. Set up an idea competition program to solicit and recognize innovative and cost-effective measures for improving transportation for disabled persons.

10. Establish a 'pool' of experts in various aspects of special transit services to provide technical assistance to service planners and operators (in conjunction with the management development program).

11. Investigate and document the experience of on-demand special transit services (as in Calgary) versus the normal day or two reservation procedure.

12. Investigate the application of microcomputers on the operation and efficiency of special transit services (esp. small operator).

13. Demonstrate and test the swivel seat and sliding mechanism that is used on German taxis in a Canadian city such as Toronto for serving the disabled traveller.

14. Investigate the feasibility and applicability of the broker concept in Canada to coordinate special transit services for the disabled. Possibly develop a 'how-to' handbook for implementation of the borkerage system.

15. Test the response of disabled persons in a small town to an unconstrained and immediately-responsive special transit service.

16. Undertake an extensive study to develop cost estimates for the Canadian experience of special transit services, versus accessible fixed-route transit, versus a combination of the two. Develop ridership estimates from market surveys. Produce cost-effectiveness indices.

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Contacts

CANADIAN ORGANIZATIONS:

*Arjan Chandan
Chief, Policy and Analysis
Surface Policy, Planning and Urban Programmes
Canadian Surface Transportation Administration
TRANSPORT CANADA
28C, Tower C, Place de Ville
Ottawa, Ontario
Tel: (613) 996-4180

*Janice Tait
Director, Transportation of the Handicapped
Policy Advice Directorate, Coordination Group
TRANSPORT CANADA
26B, Tower C, Place de Ville
Ottawa, Ontario
Tel: (613) 995-2110

*Al Cormier
Executive Director
CANADIAN URBAN TRANSIT ASSOCIATION
234 Eglington Ave. East, Suite 301
Toronto, Ontario M4P 1K5
Tel: (416) 481-3309

*David A. White
Director, Transportation
CANADIAN REHABILITATION COUNCIL
FOR THE DISABLED
Suite 2110, One Yonge Street
Toronto, Ontario M5E 1E8
Tel: (416) 862-0340

Jim Derksen
COALITION OF PROVINCIAL ORGANIZATIONS
OF THE HANDICAPPED (COPOH)
B 19 - 215 Garry Street
Winnipeg, Manitoba R3C 3P3
Tel: (204) 943-7716

AMERICAN ORGANIZATIONS

*Patricia Cass
Chief, Special Projects
URBAN MASS TRANSPORTATION ADMINISTRATION
Room 6418, DOT Building
400 7th Street S.W.
Washington, D.C. 20590
Tel: (202) 426-4984

*David Lewis
Principal Analyst
U.S. CONGRESSIONAL BUDGET OFFICE
Room 412A, House Annex II
2nd and D Streets, S.W.
Washington, d.c. 20515
Tel: (202)

*Joanne Weaver
Community and Economic Development Division
U.S. GENERAL ACCOUNTING OFFICE
441 G Street N.W.
Washington, D.C. 20548
Tel: (202) 426-2125

*William P. Konstas
Research Associate
AMERICAN PUBLIC TRANSIT ASSOCIATION
1225 Connecticut Avenue, N.W.
Suite 200
Washington, D.C. 20036
Tel: (202) 828-2810

Robert Ruffner
Director of Communications
PRESIDENTS COMMITTEE ON EMPLOYMENT
Washington, D.C.
Tel: (214) 653-5010

Dennis Cannon
U.S. ARCHITECTURAL AND TRANSPORTATION
BARRIERS COMPLIANCE BOARD
Washington, D.C.
Tel:

NATIONAL CENTER FORA BARRIER FREE ENVIRONMENT
Suite 1006
1140 Connecticut Avenue
Washington, D.C. 20036
Tel:

INTERNATIONAL ORGANIZATIONS

*Dr. Paul Dollfus, Chairman
International Commission on Technical Aids,
Building and Transportation (ICTA)
REHABILITATION INTERNATIONAL
57, Rue Albert Camus
68093 Mulhouse Cedex (France)
Tel: (89) 42.50.53

*Fernando Esteban
Principal Administrator
EUROPEAN CONFERENCE OF MINISTERS OF TRANSPORT
19, rue de Franqueville
75775 Paris Cedex 16 (France)
Tel: (01) 524.87.13

*John F. Smyth
COUNCIL OF EUROPE
Pallais de l'Europe
67006 Strassbourg Cedex (France)
Tel: (88) 61.49.61

*Anthony de Meeus
Chef de departement
UNION INTERNATIONALE DES TRANSPORTS PUBLICS
Avenue de l'Uruguay, 19
1050 Bruxelles (Belgium)
Tel: (02) 673.33.25

Anita Loring
INTERNATIONAL CEREBRAL PALSY SOCIETY
5a Netherhall Gardens
London NW5 5RN (England)
Tel:

MOBILITY INTERNATIONAL
2 Colombo Street
London SE1 8DP (England)
Tel:

Henry Enns, DPI Secretariat
DISABLED PEOPLE'S INTERNATIONAL
Bay 3, 794 Sargent Avenue
Winnipeg, Manitoba R3E 087 (Canada)
Tel: (204) 943-7716

FEDERATION INTERNATIONALE MUTILES, INVALIDES
DU TRAVAIL ET INVALIDES CIVILS (FIMITIC)
Amthausquai 11
CH-4600 Olten (Switzerland)
Tel:

Susan Hammerman
REHABILITATION INTERNATIONAL
432 Park Avenue South
New York, N.Y. (United States)
Tel:

WORLD FEDERATION OF THE DEAF
120 via Gregorio VII
I-00165 Rome (Italy)
Tel:

OTHER ORGANIZATIONS

Michael Fox, Chairman
AUSTRALIAN COUNCIL FOR REHABILITATION AND
DISABLED (ACROD)
National Committee on Access and Mobility
18 Argyle Street
Sidney, NSW 2000 (Australia)
Tel: (61) 02.27.1544

Mr. Lorand
ASSOCIATION NATIONALE D'ASSISTANCE
AUX HANDICAPES
Grand rue 231
B-6000 Charleroi (Belgium)
Tel: (71) 41.68.36

Miss G. Le Borne
Head, Technical Aids Department
RED CROSS OF BELGIUM
98, ch. Vlaurgat
B-1050 Bruxelles (Belgium)
Tel: (02) 647.10.10

Mr. A. Bieber
Chef de la Division des Transports Urbains
INSTITUT DE RECHERCHE DES TRANSPORTS
2, avenue du Gen. Mallert-Joinville
Boite postale 34
94114 Arcueil (France)
Tel:

Mr. Jean-Louis Flores
INSTITUT DE RECHERCHE DES TRANSPORTS
Centre d'Evaluation et Recherche des Nuisances
109, Avenue Salvador Allende
69672 Bron (France)
Tel:

*Ewald Pajonk
SNV STUDIENGESELLSCHAFT NAHVERKEHR mbH
Auguste Viktoria Strasse 62
D-1000 Berlin 33 (Germany)
Tel: (30) 82.00.70

Dr. Ing. Gunther Girnau
Verbands Direktor
VERBAN OFFENTLICHER VERKEHRSVETRIEBE
Kamekestrasse 37-39
5 Cologne 1 (Germany)
Tel:

Verkehrspolitische Grundsatzabteilung
HERAUSGEGEBEN BUNDESMINISTER FUR VERKEHR
(Federal Ministry of Transport)
Kennedyallee 72
D-5300 Bonn 2 (Germany)
Tel:

Mr. Colm O'Doherty
NATIONAL REHABILITATION BOARD
24/25 Clyde Road
Bullsbridge
Dublin 4 (Ireland)
Tel: (01) 68.41.81

Daniel Barak, Chairman
The Israel Center for Technical Aids, Housing
and Transportation for the Disabled
REHABILITATION CENTER
Sheba Medical Center
Tel Hashomer 52621 (Israel)
Tel: (03) 71.07.39

Miss Munira Al-Gatami
KUWAIT SOCIETY FOR THE HANDICAPPED
P.O. Box 6832
Kuwait (Kuwait)
Tel:

Mr. J. F. Van Leer
NETHERLANDS SOCIETY FOR REHABILITATION
Postbus 323
3500 ah Utrecht (Netherlands)
Tel: (30) 33.11.21

*Mr. Jayrard Cornelessen
STICHTING NEDERLANDSE GEHANDICAPTENRAAD
(Dutch Council of the Disabled)
Postbus 169
3500 ad Utrecht (Netherlands)
Tel: (30) 31.34.54

*Ingemar Berg, Direktor
Fardtjanstavdelningen (Special Service)
AB STORSTOCKHOLMS LOKALTRAFIK
Homsbergvagen 17, 5 tr.
112 51 Stockholm (Sweden)
Tel: (08) 786.26.10

*Thomas Kullbjer, Direktor
Special Services
GOTEBORGS SPARVAGAR - GS
Box 424
Alstromergatan 4
401 26 Goteborg (Sweden)
Tel: (31) 800.500

*Jan Petzall, Dipl. Ing.
Department of Handicapped Research
UNIVERSITY OF GOTEBORG
Brumsgatan 2
413 12 Goteborg (Sweden)
Tel: (31) 41.09.19

TRANSPORTRADET
(Swedish Board of Transport)
Box 1339
S-171 26 Solna (Sweden)
Tel:

*Mette Granstrom
HANDIKAPPINSTITUTET
(Swedish Institute for the Handicapped)
Box 303
S-161 26 Bromma (Sweden)
Tel: (08) 87.91.40

Mr. M. H. Baer, ing. EPFZ
Chef de Section
OFFICE FEDERAL DES TRANSPORTS
Ch-3003 Berne (Switzerland)
Tel: (31) 61.57.12

Mr. W. G. Buchanan
Special Advisor on the Transportation
of Disabled People
BRITISH RAILWAYS BOARD
222 Marylebone Road
London NW1 6JJ (United Kingdom)
Tel: (01) 262.32.32

Miss A. Fryre
Department of Transport
TRANSPORT POLICY REVIEW UNIT
Room N9103
2 Marsham Street
London SW1 (United Kingdom)
Tel: (01) 212.44.31

Mr. Bert Massie
Executive Assistant to the Director
THE ROYAL ASSOCIATION FOR DISABILITY
AND REHABILITATION
25 Mortimer Street
London W1N 8AB (United Kingdom)
Tel: (01) 637.54.00

* indicates personal contact for this study

POOR

QUALITY

ORIGINAL